



**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

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Order Instituting Rulemaking to Implement the
Commission's Procurement Incentive
Framework and to Examine the Integration of
Greenhouse Gas Emissions Standards into
Procurement Policies

R.06-04-009

**COMMENTS OF
THE ENERGY PRODUCERS AND USERS COALITION
ON THE PROPOSED DECISION**

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August 13, 2007

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These comments address an apparent misperception of the energy and greenhouse gas (GHG) production attributes of relatively rare bottoming-cycle cogeneration facilities. The Energy Producers and Users Coalition¹ seek changes in the Proposed Decision dated July 23, 2007 to modify Decision 07-01-039 so that bottoming-cycle cogeneration is correctly and properly treated. The GHG procurement treatment of bottoming-cycle facilities should reflect their unique and beneficial operational and emission attributes.

I. INTRODUCTION

It is neither novel nor unprecedented for regulatory agencies to recognize and distinguish the relatively rare attributes of bottoming-cycle facilities. As noted by the Department of Energy --

In bottoming cycles, the thermal energy is first used to provide process heat, from which waste heat is subsequently recovered to generate electricity. Bottoming cycle applications are less common and are usually associated with high-temperature industrial processes. Because cogeneration involves the recovery and use of

¹ EPUC is an ad hoc group representing the electric end use and customer generation interests of the following companies: Aera Energy LLC, BP West Coast Products, Chevron U.S.A. Inc., Shell Oil Products US, THUMS Long Beach Company, and Occidental Elk Hills, Inc.

thermal energy that would otherwise be wasted, it reduces the amount of fossil fuel that must be burned to meet electrical and thermal energy requirements, hence reducing greenhouse gas emissions.²

While relatively rare, California does have bottoming-cycle combined heat and power (CHP) facilities, especially in industrial calciners for the refining and production of petroleum coke. Accordingly, it is important that GHG procurement policy, and especially the formulas designed to implement that policy, properly reflects the production and emission attributes of these operations.

The Proposed Decision requires modification to address several issues:

1. The treatment to bottoming-cycle cogeneration and topping cycle cogeneration must not be the same in the context of considering GHG emissions; they are distinctly different.
2. The formula adopted in Decision 07-01-039 is reflective of a topping cycle operation where a single fuel input produces two different outputs sequentially – electricity and thermal energy. In a topping-cycle operation a change in fuel input changes the two outputs and therefore the GHG emissions. This formula does not reflect the emissions from a bottoming-cycle operation. In contrast to a topping cycle, the bottoming-cycle uses the entire fuel input to drive the industrial production process, e.g., calcining petroleum coke. The waste heat from this process would be either vented to the atmosphere (as part of the industrial process), or it can be used in energy production. There is no increase in GHG emissions from the

²

<http://www.eia.doe.gov/oiarf/1605/vr96rpt/chap2.html>

- use of the waste heat in energy production, yet the formula would erroneously reflect that it does. The GHG production is entirely related to the industrial process.
3. For a topping cycle process, it is appropriate that the formula allocate emissions between the two outputs, electricity and thermal energy. But for a bottoming-cycle operation the same amount of emissions will be produced from the industrial process regardless of the electricity generated.
4. The formula adopted in the Proposed Decision appears to erroneously establish that all emissions are attributed to energy, and nothing to an industrial thermal process requirement. As a result there is a need to clarify ambiguities in the formula from the Proposed Decision and to elaborate on the objectives of the GHG formula relative to industrial process emissions.

The Proposed Decision warrants modification and clarification with regard to the treatment of bottoming-cycle operations, and the formula for determining the allocation of GHG emissions. Just like the Department of Energy, the CPUC should recognize the relatively rare features of bottoming-cycle operations and their benefits with regard to GHG emissions.

II. ELECTRICITY GENERATED BY A BOTTOMING-CYCLE UNIT IS CARBON NEUTRAL AND THE COMMISSION'S DECISION FAILS TO EMBRACE THIS FACT

A primary example of a California bottoming-cycle process is the refining of petroleum coke in a calciner. The industrial process of calcining utilizes fuel to

super heat raw materials to produce petroleum coke. All fuel used in this process sustains the industrial process and production. There is waste heat that goes unused and is often vented to the atmosphere as a natural consequence of this industrial process. This is a so-called bottoming-cycle unit, because the industrial process (on the bottom) uses all the fuel and energy for the process and production, and waste heat is left over (on the top).

The industrial calcining process requires the same fuel and energy input regardless of the generation of any electricity. No additional fuel is added to generate electricity. This is a fundamental difference from a topping-cycle unit.

In the topping-cycle process, the fuel input supports the generation of both electricity and thermal energy. The fuel first fires a combustion turbine generating electricity. But the amount of fuel input is greater than that required only to generate electricity. Some additional amount of fuel is input in order to produce sufficient energy to then generate thermal energy in the second phase of cogeneration. The total amount of fuel input is driven both by the electric generation and thermal production phases. If either phase were discontinued, the remaining process would require less fuel on a stand-alone basis.

In the calcining process, the total energy input is required to refine petroleum coke. Some of the energy input is absorbed by the material in making its physical change. This produces a commodity (petroleum coke) and waste heat, which is partially recaptured by a waste heat recovery boiler. This waste heat is then used to produce steam that drives a steam turbine to produce electricity. So the calcining process produces an industrial commodity

(petroleum coke) and the waste heat recovery process produces electricity.

There is no need to allocate emissions between two outputs because all the fuel is required by the industrial process, completely independent of any subsequent downstream electrical production.

As a result the electricity from a bottoming cycle cogeneration facility should be considered a carbon-free product since:

- the heat generated from the industrial process would otherwise be waste exhausted to the atmosphere absent an additional capital investment (waste heat recovery boiler and steam turbine) to capture the waste heat to make electricity; and,
- the resulting electricity that is produced results in avoided fuel use for electricity which would otherwise have been produced elsewhere at a fossil fuel fired electric generating facility.

The formula addressed in Decision 07-01-039 is to establish an Emissions Performance Standard for generic types of generation facilities. The emissions rate resulting from this formula will establish the emissions rate for bottoming-cycle calcining operations. Yet since electric generation from a bottoming-cycle facility will not change GHG emissions, the formula needs to be modified to reflect this fact.

Another consideration is the treatment of changes in electric generation resulting in changes in GHG emission calculations. For topping cycle units, the formula derives an emissions rate that is a product of the electricity generation. This means that the emissions rate would change if the electricity generated

changed. But for bottoming-cycle units, the formula does not produce a parallel result. The emissions rate for a bottoming-cycle facility under the formula does not change in any way dependent on the amount of electricity produced. Instead the formula should properly reflect the allocation of no emissions to the electric generation from a bottoming-cycle operation. The emissions rate should be entirely allocated to the industrial process.

III. BOTTOMING-CYCLE UNITS REQUIRE DIFFERENT RECOGNITION AND TREATMENT UNDER FERC DEFINITIONS RELIED UPON BY THE PROPOSED DECISION

The Proposed Decision relies on the FERC definition that requires bottoming-cycle facilities to first use energy in a “useful thermal energy application or process.” The calcining of petroleum coke is one such process, where the thermal energy of the natural gas input is used to initiate refining of the coke. The refining process releases additional combustion products from the coke which add additional thermal energy to the process. The high temperature produced by this process is partially absorbed by the coke and physically changes the coke into a useful industrial product. After the completion of the petroleum coke refining process there is some remaining thermal energy which is vented to the atmosphere. Regardless of what is done with that waste heat, the energy required for the calcining would be the same and the carbon emissions would be the same.

Notwithstanding, the Proposed Decision’s recognition of the FERC regulation related to a bottoming-cycle process, there is an apparent failure to embrace this distinction.

The calciner process is fundamentally different than an electricity or thermal generation *output*. In a topping-cycle cogenerator, there are two energy outputs. The outputs, generally electricity and a thermal output, are substitutes for comparable output of a stand-alone generator and boiler. The total fuel input to a topping cycle unit, and therefore its emissions, is a combination of the requirements for both phases. It is appropriate to attribute responsibility for emissions to both outputs. Attribution is a straightforward conversion of the two energy products into common units.

In a calciner, however, there is no useful thermal output; the only output is the refined commodity (petroleum coke). The waste heat in the flue gas is a part of the industrial process and not a separate output of a generation process. For these reasons, bottoming-cycle units should receive a different treatment than the CPUC decision related to topping-cycle operations. Emissions from bottoming-cycle facilities should be attributed entirely to the industrial process. The adopted formula sustained in the Proposed Decision erroneously fails to recognize this distinction and presents other ambiguities that warrant correction.

IV. THE “CLARIFICATION” IN THE PROPOSED DECISION OF THE BOTTOMING-CYCLE FORMULA IS AMBIGUOUS AND REQUIRES MORE DETAIL

The Proposed Decision adds the following language to the interim decision:

The numerator of the conversion formula for a bottoming-cycle cogeneration facility would reflect the total emissions from the facility, including both fuel used in the industrial process as well as any supplemental firing. The denominator of energy produced would include a thermal credit (through the 3,413 Btu/kWh standard conversion factor) for the thermal energy produced by the industrial

process that is used for electricity generation in the waste heat boiler.

Clarification of this formula is necessary to address several questions.

Does the denominator contain only the energy used to generate electricity? If so, then all emissions would be attributed to electricity. The resulting emission rate would allocate all carbon emissions to the KW generated by the electricity function.

If the denominator is the total energy produced by the system, then the formula would be:

$$\frac{\text{Total emissions}}{\text{Total energy output}}$$

The denominator would be composed of the energy removed by the electricity generating process and the remaining thermal energy in the waste heat exhaust. This would allocate emissions between the useful electricity output and the waste heat exhausted. It does not take into consideration the energy consumed in the refining process.

If the denominator is, instead, the total energy input, then the resulting emission rate is the emission rate for the calcining process, and is independent of any electricity being generated. As these questions demonstrate, the formula applied to topping-cycle units simply does not work for bottoming-cycle units and warrants revision.

V. CONCLUSION

Bottoming-cycle units are fundamentally different than topping cycle units in that all of the energy input is required for the industrial process. There is no additional fuel required if electric generation facilities are added to the waste heat stream. All emissions from such operations should be attributed to the industrial process which necessarily produces all of the emissions.

August 13, 2007

Respectfully submitted,

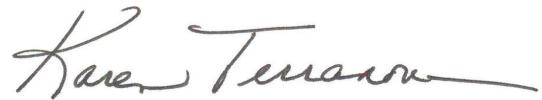
A handwritten signature in black ink, appearing to read "Michael Alcantar".

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CERTIFICATE OF SERVICE

I, Karen Terranova hereby certify that I have on this date caused the attached **Comments of the Energy Producers and Users Coalition on the Proposed Decision** in R.06-04-009 to be served to all known parties by either United States mail or electronic mail, to each party named in the official attached service list obtained from the Commission's website, attached hereto, and pursuant to the Commission's Rules of Practice and Procedure.

Dated August 13, 2007 at San Francisco, California.



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